

Driving the future of Mobile Communications in India

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Since the day the first cell phone call was made in India on July 31, 1995, India has witnessed tremendous growth in telecom sector. From a telecom subscriber base of under 15 Million in 1995, today we have billion plus subscribers with an overall tele-density of 88%. This has been made possible primarily due to an exponential growth in cellular mobile communications supported by a liberalized market with regulatory reforms. While we have about 1.1 Billion mobile subscribers, the number of wireline subscribers remains only 20 Million ! Despite this spectacular growth, where the urban tele-density has crossed 100%, the rural tele-density is still 58% as of this writing. Moreover, the number of broadband subscribers is about 700 Million. Undoubtedly, rural connectivity and broadband penetration will be the key focus areas for the next decade for achieving nationwide digital empowerment.

I have been fortunate to be associated with telecom research, technology development, policy and regulatory changes in the country for the last twenty five years. In this article, I would not like to dwell upon technology and regulatory changes that were responsible for the growth in mobile communications as that would have been written in other articles in the magazine. In this article, I would like to recapitulate my experiences and involvement in establishing Telecom Standards Development India (TSDSI) which brought India on world's standards map with a potential of altering the landscape of telecom sector in the next twenty five years !

Though India quickly emerged as the second largest telecom market in the world, most of this growth story has been largely scripted by the import of telecom equipment with very little value additions in India. Cellular mobile communications industry is heavily driven by global standards such as Third Generation (3G) Partnership Project (3GPP), ITU etc. Though India has built a strong software and services industry, it is still not a significant player in telecom technology development and has marginal intellectual property rights (IPR) and contributions to global telecom standards. Many of us from the academia and industry had long felt the need for India's own Telecom Standards Development organization. In a standard and IPR driven industry, it is necessary that we should collaborate in the global efforts for developing standards to promote Indian requirements and intellectual property.

One of the significant events in industry-academia partnerships in Indian telecom scene was setting up of "Telecom Centers of Excellence (TCOE)" in 2007-8 in IIT Delhi, Bombay, Kanpur, Kharagpur, Madras, IISc and IIM Ahmedabad. It brought telecom service providers and academia together on a common platform. I led the TCOE in IIT Bombay that was setup in partnership with Tata Teleservices and Department of Telecom (DoT). Though TCOEs are defunct now, it did help in catalyzing industry-academia partnership. The idea of forming Indian Telecom Standards

Development organization was first formally mooted in the Governing Council meeting of TCOEs in September 2009 held in IIT Bombay. Following this, we held several discussions with DoT officials and a formal proposal was then submitted to the ministry in September 2010.

Meanwhile, Telecom Regulatory Authority of India (TRAI)'s recommendations of April 2011 on Telecom Equipment Manufacturing policy also emphasized the need to influence global standards. With strong support from academia, operators, technology vendors and industry associations such as Cellular Operators Association of India (COAI), DoT articulated the importance of telecom standards organization in National Telecom Policy (NTP) 2012. NTP 2012 resolved to *promote setting up of Telecommunications Standard Development Organization (TSDO) as an autonomous body with effective participation of the government, industry, R&D centers, service providers and academia to drive consensus regarding standards to meet national requirements including security needs.*

Following several discussions with industry, TCOEs and industry associations such as COAI, AUSPI, we submitted the draft bye-laws and operational plans for setting up TSDO in public-private partnership in May 2012. The organization was named as DOSTI- Development Organization of Standards for Telecom in India. However, even after DoT's intent to setup such an SDO, formal approval was not accorded to DOSTI and protracted discussions continued for the whole of 2012. But, we persisted in our efforts. Towards the beginning of year 2013, DOSTI held several meetings. A turning point was reached in May 2013 when Indian delegation was invited to attend Global Standards Collaboration's 17th meeting (GSC-17) at Jeju Island in Republic of Korea. The delegation was led by Ms. Rita Teotia, then Additional Secretary. I was also part of the delegation. She made an historic statement before all international telecom standards bodies, *"I am pleased to announce that, with the support of all stakeholders –industry (manufacturers, service provider and R&D units), academia and Government, we have now been able to complete all the ground work required for establishing the **Telecom Standards Development Society, India (TSDSI)**. We expect the body to be registered and to begin functioning shortly and also that it will include all stakeholders including indigenous manufacturers, service providers, research and academic bodies and Government societies and organizations".* Subsequently, TSDSI's Bye Laws were approved by DoT. TSDSI was formally launched on 8th November 2013 in C-DoT Delhi where cooperation agreements were signed with global standards bodies.

TSDSI formally came into being on 7th January, 2014 after being registered with the Registrar of Societies, Delhi. Dr Kumar Sivarajan of Tejas Networks was elected as the Chairman and I was elected as the Vice Chairman in the first Governing Council elections held in October 2014 (I later became the Chairman in October 2016). With a modest membership of 11 in the beginning, it has now grown into a healthy forum with 70 organizations.

The next historical milestone was achieved when TSDSI became the 7th Organizational Partner of 3GPP in January 2015 and joined the club of ARIB & TTC of Japan, ATIS of USA, CCSA of China, ETSI of Europe and TTA of Korea. This enabled TSDSI members to participate in 3GPP meetings and influence future wireless standards such as 5G. TSDSI can also "transpose" (i.e. adopt) 3GPP

specifications for IMT 2000 (3G), IMT Advanced (4G LTE) and future telecom technologies as its own standards. After spending initial years on membership drive, drafting IPR policy, Working Procedures for technical work and setting up Secretariat resources, TSDSI members have started actively participating for influencing global standards.

While India clearly missed 2G, 3G and 4G bus, we wanted to make a new beginning in 5G. This was the time when work for the development of 5G standards (IMT2020 in ITU parlance) was picking up in 3GPP and ITU. Very soon, our contribution on Low Mobility Large Cell (LMLC) configuration was included as a mandatory test configuration under the Rural eMBB test environment in IMT2020 Technical Performance Requirements (TPR) with an enhanced Inter Site Distance (ISD) of 6 km in 2017. This test case addresses the problem of rural coverage by mandating large cell sizes in a rural terrain and scattered areas in developing as well as developed countries. TSDSI members followed this up with indigenously developed proposal on a Radio Interface Technology (RIT), (compatible with 3GPP), for IMT2020 standards to ITU, that serves the LMLC requirements. This technology has qualified for inclusion in IMT 2020 specifications as an independent technology, catapulting India into the club of standards defining entities, a historical milestone. Under the leadership of Prof Bhaskar Ramamurthi, TSDSI has made rapid strides in the last two years.

In 2G and 3G technologies, most of the IPR has been held by US and Europe, however, IPR and standards essential patents holding have slowly shifted to Asia-Pacific (mostly China, South Korea and Japan) in 4G and 5G technologies. Going forward, we have a wonderful opportunity to develop an Indian eco-system of 5G and beyond 5G telecom industry. Unlike in the times of 2G/3G, competencies of Indian companies in the domain of 4G/5G have significantly gone up. In an all pervasive digital world, 5G and beyond technologies are likely to affect not only communications but other sectors like healthcare, transportation, agriculture, automotive etc. The development of an indigenous eco-system is not only important from the economic point of view but also from the nation's strategic and security reasons. Enhanced focus on IPR creations and influencing global standards with standards essential patents would be paramount for making us self-reliant ("Atmanirbhar").

With TSDSI firmly in place, let us make India a global force to reckon with in the next 25 years !!